What is Regenerative Forestry and Why is it Important?

Robin Walter introduces the concept of Regenerative Forestry, explains what it is and its relevance to the development of forestry practice.

Regenerative Forestry seeks to produce timber whilst restoring the forest to a functional ecology – especially with regard to carbon, biodiversity and people (Soil Association, 2022a).

We humans are steadily destroying the benign envelope within which our civilisation has evolved, whilst unravelling the web of life-support that sustains us all – processes that have led to the climate and ecological emergencies. As land managers, we foresters are well aware of this – but although we may be facing these challenges, how can we adopt regenerative practices in the face of such challenges?

Raising the alarm still further, the recent 'Horizon scan of issues affecting UK forest management within 50 years' (Tew et al., 2023), covered in *QJF* April 2024, noted that "catastrophic forest ecosystem collapse" was "the most highly ranked issue" by the expert panel, describing it as "a fundamental issue that underpins the future potential of UK forests". Any realistic risk assessment of UK forestry would conclude that we are highly exposed.

Evidence review

In 2022 the Soil Association set out its vision for UK forestry in its *Regenerative Forestry Report* (Soil Association, 2022a), based on its extensive experience in forest certification, nature conservation and agro-ecological farming. The report focused on whether it is possible to manage UK forests, in particular the plantation resource established in the 20th century, to achieve a better carbon balance (in forest and out of forest) and to increase the abundance of nature, whilst ensuring strong livelihoods in the forestry supply chain.

In some ways this is a golden age for forestry – timber prices are high, forest products are recognised as sustainable, and there is widespread public support for more trees. Yet our forests suffer increasingly from pests and diseases, from drought, storms and even wildfires; our forest wildlife continues to decline; our silviculture is rooted in century-old practice, and there is some public opposition to forest expansion.

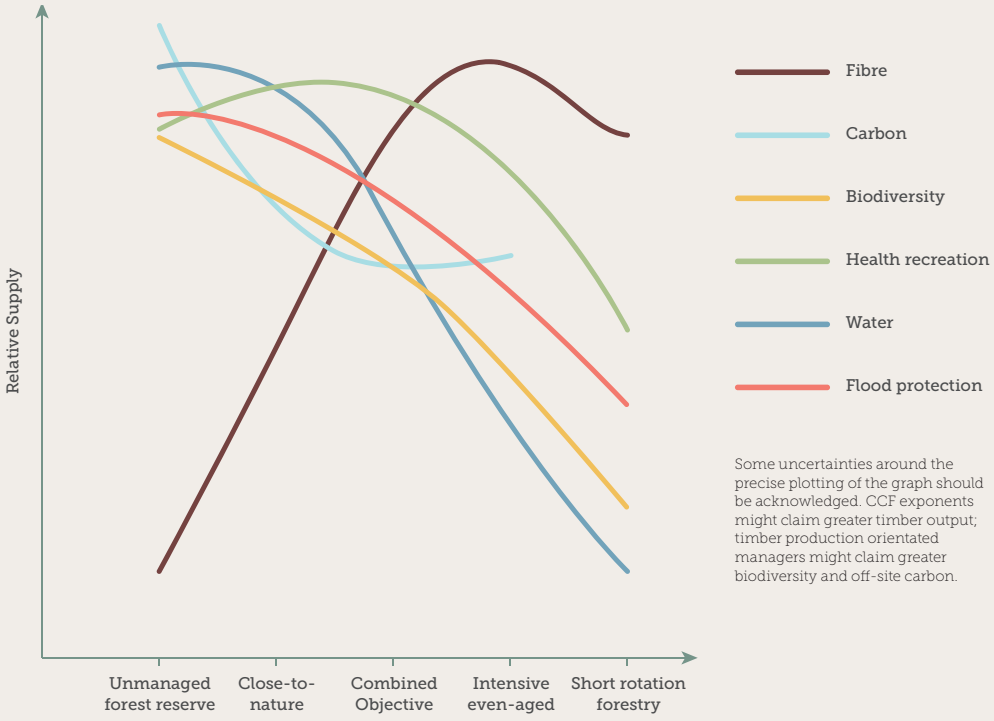
The UK's low forest cover has been increased over the last century to 13% – about half of this is plantation conifers and almost half of that is Sitka spruce – yet forest biodiversity has been plummeting, as has biodiversity across all habitats in the UK. Whatever we are doing now is not working! Along with other land managers, we need to take a long hard look at our practice and consider how we might respond. We need to regenerate our forest environments to become active components of a functional landscape ecology. This means our forests need to be hospitable to wildlife and linked in a 'forest habitat network' (Peterken, 2002); our wider landscapes (not just nature reserves) need to accommodate natural processes (The Wildlife Trusts, 2018); and this ecological foundation can support a multi-functional land-use which meets social needs (The Royal Society, 2023).

The case for Regenerative Forestry

The term sustainable forest management suggests a practice which can continue indefinitely. However, in the UK we still live in a massively deforested and increasingly depleted land. Sustaining the status quo will no longer suffice. We need to be actively restoring and regenerating

our life support systems and our damaged relationship with nature. We also need to reconsider our economic practices – what do we value, how do we protect it and how do we produce more? Forestry and farming are uniquely placed to lead the way, covering much of the land and engaging with nature in our daily practice. We need not only to conserve what is there, but to improve our landscapes to become diverse and thriving ecosystems, adaptive to change.

Regenerative Forestry seeks to do this by sequestering and storing high levels of carbon to help rebalance our destabilised climate; by promoting resilient and adaptive forests to restore our depleted biodiversity; and by generating timber and other products, with wide public approval, to support meaningful livelihoods.



Description	Management Intensity
Unmanaged forest reserve	Interventions restricted to recreation provision (e.g. car parks and trails) and protection from browsing
Close-to-nature	Interventions mimic natural processes, e.g. long rotation lengths, harvesting by single stem and group selection
Combined objective	Limited interventions to deliver timber and other ecosystem services in an integrative (not zoned) approach. Longer rotations at or above maximum mean annual increment
Intensive even-aged	Interventions follow production goals:single-aged monocultures or small per cent admixtures species, typically harvested by clearcut. Rotation lengths at a below maximum mean annual increment
Short rotation forestry	Intensive management for maximum biomass production, single-aged monocultures grown on short rotations (~20 years), whole tree harvesting to maximise volume

Figure 1. Impact of forest management approaches on the relative supply of ecosystem services (adapted from Sing et al., 2018).

The challenge of multiple objectives

The *Regenerative Forestry Report* focuses on three key areas: climate, nature and people. Of all the many papers and reports reviewed in compiling the report, a graphic from Sing et al. (2018), reproduced here as Figure 1, gives the clearest description of the problem. Along the bottom axis the intensity of management increases from unmanaged forest reserve (bottom left) through close-to-nature (broadly continuous cover forestry, CCF), to combined objective (roughly estate forestry), to intensive even-aged (we are all familiar with that) and short rotation forestry (bottom right). Against this are mapped the provision of various ecosystem services, including carbon, biodiversity and public health.

The 'unmanaged forest reserve' on the left provides good services for carbon, water, health and biodiversity, but no timber. As the management for fibre or timber increases, all the other services we might want from a forest decrease. The graph illustrates general trends, but the specifics when compared between options are not always so clear, hence CCF practitioners might well argue that their timber output is as high as clearfell systems, and of higher quality, whilst plantation managers might make greater claims for biodiversity and carbon in harvested wood products.

In the report we advocate aiming for a management

approach which combines the best of close-to-nature forestry and combined objective forestry, with continuous cover forestry offering particularly good potential in meeting most objectives whilst regenerating forest condition. The aim is to optimise a range of benefits, not to maximise just one.

Plantation monoculture forestry was the answer to questions we were asking 100 years ago – how can we build a national strategic timber resource at speed? Sustainable forest management was the response to the changing mood of the 1990s and greater environmental concerns. Today we have new questions, more urgent questions, and the issue of timber is ever more relevant. We need forests to play their key role in carbon cycles, to support more biodiversity than ever before, and to contribute to the life and soul of our shared landscapes.

If we want to increase forest cover – 19% is the government target, but could be much higher – then we need to create forests that appeal to people, that they welcome to their neighbourhoods, that they love to visit. We need a renewed social licence to operate at national scale. It can be done, as shown in the National Forest over the last 30 years (Everitt, 2023).

Climate

We reviewed the role of forests in the carbon cycle, how forests can help mitigate climate change, how forests are impacted, and we consider the important role of harvested wood products.

- Soils are the foundation of a healthy forest. Trees mediate between air and soil in constant dynamic interaction – always cycling carbon. We need to pay more attention to these cycles to ensure the continued fertility of the soil and to strengthen its role in storing carbon, especially on peat soils.
- Soil disturbance should be minimised, especially on peaty and organo-mineral soils rich in carbon, with special attention to ground preparation, planting methods, and compaction and erosion during harvesting.
- Growing trees clearly sequester carbon, but also consider soils, existing biodiversity, tree species, future management, harvesting (or not) of timber, the fate of the harvested wood products, and timescale.
- New native broadleaved woodland is a good carbon sink over the long term and has biodiversity benefits. High-yielding conifers sequester carbon faster and have more limited biodiversity benefits. We need both.
- Harvested wood products, especially if they have long-term uses, make a significant contribution to the carbon balance of the forest.

> "Regenerative Forestry seeks to produce timber whilst restoring the forest to a functional ecology – especially with regard to carbon, biodiversity and people."

Nature

Our forests are losing their wildlife, both through our actions within the forest and in the wider landscape. As with farming, we cannot simply 'do nature' somewhere else. We have to integrate it into the very fabric of our forests. The evidence shows that this will strengthen resilience.

- The UK's forests, as well as wider landscapes, continue to lose biodiversity: The Forestry Commission *Woodland Ecological Condition 2020* shows only 7% of our native woods and 1% of our conifer plantations are in favourable condition (Ditchburn, 2020).
- The 2019 *State of Nature Report* corroborates this, showing the losses to woodland biodiversity since 1970, especially from lack of management and high levels of browsing by deer, also recreational disturbance and nitrogen pollution (Hayhow, 2019).
- Soil biodiversity has been generally neglected over the years. We have known about mycorrhizae for decades, but we are only just beginning to appreciate the role played by mycorrhizal fungal networks in sustaining the health of the forest – transporting carbon, water, nutrients and stress signals between plants over tens of metres and over hours and days.
- Maintaining forest conditions, by retaining canopy cover and increasing diversity of species, age and structure, better supports the forest's ecological processes.

People

Why do people love forests but hate forestry? At our best, we have a great story to tell and wonderful places to share. We have to take the public with us on our journey of regeneration. We also need skilled people to undertake this epic task.

- People prefer mature forest with retained trees, with a slight preference for broadleaved over conifer, and they prefer close-to-nature forestry over more intensive methods, such as clearfelling.

- The British public loves trees and forests but appears to have less love for – and understanding of – forestry practice. Trees and forests inhabit the public realm, even when they are growing on private land. They are big, enduring, visible components of our shared space and as such people develop feelings of admiration, joy, familiarity, love for them. It is these accumulated values, as well as the wildlife, that can be lost when forests are felled. The sole focus on timber is perceived as a neglect of other values.
- Forests are an order of magnitude more valuable when natural capital is accounted for, compared to a purely economic assessment. For example, a Dorset study shows when ecosystem services are included, rural land uses were ten times more valuable than under conventional accounting (Newton, 2019).
- There are significant skills and capacity gaps across the forestry sector, which are being addressed by a range of initiatives.

What does Regenerative Forestry look like?

What management practices are best suited to addressing the challenges of climate change, biodiversity loss, and a thriving and popular timber industry? The research shows that moving from intensive even-aged stands to close-to-nature stands brings significant benefits for carbon cycling, biodiversity, water quality and public benefit, just as in Sing et al.'s graph (Figure 1). The 'horizon scan' panel confirm this: "Fortunately, the UK forest sector does broadly understand what needs to be done to increase forest resilience and reduce the likelihood of catastrophic ecosystem collapse, e.g. increasing tree species and structural diversity, promoting wider ecosystem integrity and supporting biodiversity" (Tew et al., 2023).

> "Why do people love forests but hate forestry?"

So can CCF provide all these benefits, whilst still producing enough timber? The evidence is promising, though there will be places where CCF is limited by stand stability and access, as well as skilled managers (Figure 2).

For climate, CCF is advantageous because it avoids the sudden intervention and disturbance of clearfelling and restocking. Loss of forest cover can lead to exposure to the sun and rain, causing loss of nutrients and soil carbon, compaction and disruption of soil organisms. Retaining a protective mantle of cover means that mycorrhizal networks are preserved and soil chemistry is closer to natural forest

Figure 2. Continuous cover forestry optimises a range of benefits and is an example of Regenerative Forestry in action, as shown by applications in (above) mixed conifers in Ennerdale, Lake District *(continued on next page).*

stands. Mixed stands of broadleaves and conifers further benefit forest soils, with better cycling of nutrients. Reducing soil disturbance is key, which means adopting less intensive silvicultural systems.

For nature, CCF can maintain the greater diversity required at all levels of the forest – genetic diversity within each species, a wider range of tree species, especially in our single species plantations, and a greater structural and age diversity within the stand. Diversity is the basis of productivity, resilience and adaptation. Ancient and veteran trees, deadwood, open space, understorey, minor species – all these are easily accommodated within a CCF stand.

Some species are better suited to the periodic open space created by clearfell regimes, such as upland birds, so at a landscape scale the ideal is to have a mix of CCF and clearfell, which will probably be suggested by wind stability anyway.

For people, CCF has been recognised (in Wales) as the management system to provide the most attractive and diverse forests, both within the forest and the wider landscape; to this end, at high profile recreational sites, clearfelling has been deemed the option of 'last resort' (NRW, 2017).

Figure 2 (cont.). Continuous cover forestry optimises a range of benefits and is an example of Regenerative Forestry in action, as shown by applications in (anticlockwise from top): Douglas fir at Stourhead Western Estate, Wiltshire; Douglas fir and birch, Wentwood, Monmouthshire; and silver fir, Norway spruce and beech forests in the Carpathian Mountains, Romania.

As for timber production, there are examples of CCF where after a transformation period the average sawlog size is bigger, with less low-grade material, and without the financial peaks and troughs of clearfell/restock.

More forests

We need more timber and fibre as we transition to a net-zero economy, and we only produce about 20% of our own. In a world of increasing uncertainty, it would be prudent to grow more of our own (just how much more would be the subject of another article), so we need to increase productive woodland cover.

> "So can CCF provide all these benefits, whilst still producing enough timber? The evidence is promising."

New forests must be established with careful thought for their location and composition: avoiding fragile soils and valuable habitats, linking to other biodiverse habitats, including a site-sensitive mix of species, allowing natural processes to play a role where appropriate.

The Soil Association has been very active in promoting agroforestry and trees on farms (Soil Association, 2022b). They advocate for a farmer-led tree revolution to help meet tree planting targets, with the opportunity to double farm woodland and integrate more trees into the landscape.

Key features of Regenerative Forestry practices:

- Is this stand or forest in a better condition than before?
- Is it locking up carbon in soils, trees and timber?
- Is it home to more nature?
- Is it supporting local people and livelihoods?
- Is it contributing to a diverse and ecologically functional landscape?
- Is it more resilient?
- Are we giving back more than we are taking?
- Can it continue to do all this for the foreseeable future?

For more information on Regenerative Forestry, download a free copy of the report, plus the evidence report, with full list of research references, from the Soil Association website below.

Author's note and acknowledgements

This article is founded on the research work and some of the content of the Soil Association report *Regenerative Forestry: Forestry and forests for the future* published in February 2022. However, the article is written by myself alone and whilst the Soil Association's position on Regenerative Forestry remains consistent with the report, the organisation has not contributed directly to this article. The Soil Association commissioned the report to influence the thinking around the case for Regenerative Forestry and what it is. The organisation does not claim any title over the term 'Regenerative Forestry' and has welcomed the continued development of the term over the last two years, since the report was published.

Clive Thomas, MICFor, commissioned the research and content for the report on behalf of the Soil Association and helped to co-author some of the policy-relevant sections of the report. Contact: cthomas@soilassociation.org.

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